STRAPS: A Community-Based Study of Traffic-Related Particle Exposures and Respiratory Health Among Urban Youth

Authors: J. Correa[1], S. Chillrud[2], F. Family[2], M. Feinberg[3], Y. Hazi[1], D. KC[4], M. Patel[1], S. Prakash[4], J. Ross[2], N. Sheats[2], D. Levy[5], M. Iedema[6], J. Cowin[6], P. Kinney[1]
[1]Department of Environmental Health Sciences, Mailman School of Public Health at Columbia University
[2]Lamont-Doherty Earth Observatory, Columbia University
[3]For a Better Bronx
[4]West Harlem Environmental Action, Inc.
[5]Department of Biostatistics, Mailman School of Public Health at Columbia University
[6]Pacific Northwest National Laboratory

Keywords: diesel exhaust, PM, air pollution, health effects, black carbon

Background: Disproportionately high asthma prevalence, morbidity, and elevated exposures to a mix of air pollutants are among the environmental health challenges faced by New York City's communities of color. There is some epidemiologic evidence linking diesel exhaust particle (DEP) exposures to asthma morbidity. The School Traffic and Air Pollution Study (STRAPS) is a community-based participatory research project designed to improve our understanding of the role of traffic-related particulate matter, including DEP, in respiratory morbidity among New York City adolescent residents. Its objective is to answer the question, "Does school proximity to traffic sources influence exposures and health status of school children?"

Design and Methods: Real-time black carbon (BC) and particulate matter ($PM_{2.5}$) were monitored at four high schools in the NYC metropolitan area. One school, termed S1, was located in a suburban area with lower volumes of traffic. The three urban schools, termed U1, U2 (Bronx), and U3 (Manhattan), represented a range of local traffic impacts from moderate to high. Daily symptom questionnaires were collected from participating students.

Results: Cross-sectional analyses showed that levels of ambient BC were higher at urban schools (median of 1.5 and 1.8 $\mu g/m^3$) versus the suburban school (median of 0.6 $\mu g/m^3$). Despite differences in traffic patterns, levels of BC at two of the urban schools were similar. Prevalence of asthma and visits to the emergency room for respiratory symptoms among surveyed students were higher at the urban vs. suburban schools (prevalence: 30.8 and 29.4% vs. 12.1%).

Conclusion: These preliminary findings show that urban school children are exposed to higher levels of traffic-related PM and have a higher prevalence of doctor-diagnosed asthma than suburban children.

Acknowledgments: We thank all the students, teachers, and staff from the high schools that participated in the present study. We also wish to thank the Board of Education of New York City and Rockland County for allowing us to conduct this study.

This study was supported by the National Institute of Environmental Health Sciences Grant No. ES11379 and Center Grant No. 5P30 ES009089.

Point of Contact:
Juan C. Correa, MD MPH
Associate Research Scientist
Department of Environmental Health Sciences
Mailman School of Public Health
Columbia University
622 W 168th St., Room 10-405
New York, NY 10032
212-305-8654
jcc67@columbia.edu